State of New Hampshire
Inter-Agency Collaboration for Environmental Public Health Tracking
Submitted May 24, 2006
Five-Year EPHT Application Narrative

GRANTEE STRENGTHS

➤ Direct access to core content datasets

➤ Early implementation of IT infrastructure

➤ PHIN-MS installed

➤ Inter-agency collaboration & resource sharing

➤ Action-oriented strategies

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Disease Control and Prevention

National Environmental Public Health Tracking Program – Network Implementation

Funding Opportunity Number: CDC-RFA-EH06-601

Statement of Eligibility: In regard to eligibility for RFA-EH06-601, the State of New Hampshire is fully qualified to apply for and receive this cooperative funding opportunity. The NH EPHT Program has conducted planning and capacity-building activities and infrastructure enhancements, including demonstration projects, which serve as building blocks for the implementation of statewide and national EPHT networks. The NH EPHT Program has also developed plans for a staged implementation of a standards-based EPHT network, and has posted our plan on our website (NHEPHT NIP.pdf). The NH EPHT Program has successfully completed these multi-phase planning processes and is ready to move into the network implementation phase. As well, the NH EPHT Program also successfully completed all work proposed under Program Announcement 02179.

APPLICATION CROSSWALK - To ensure that the NH application includes all requirements of the RFA, we developed a 'crosswalk table' that provides a comparison of all required RFA elements in the left-hand columns, and the NH response to these elements in the right-hand columns. In this way, the reviewers will be able to identify and locate RFA elements in the NH proposal. http://www.cdc.gov/od/pgo/funding/EH06-601.htm

RFA REQUIREMENTS	RFA SCORE	NH App. Location	NH APPLICATION SECTION
Cover page			
Executive Summary	*	p. 1-2	See front of narrative
1. State Operational Plan & Methods (35)			
Measurable Objectives	5	p. 7-10, 46-47	See Section 1
Project Design and Methods	10	p. 3-7, throughout	See Section 1, 2 and Appendices A-C
Tracking Design and Methods	10	p. 11-25, 25-33	See Section 1, 2, 3
Limitations and Options	5	p. 5-6	See Section 1 and others
Clarity and State-national links	5	p. 3-5, 28	See Section 1 and others
2. Existing Resources (30)			
Past success and data access	12	p. 20-25, 38	See Appendix N: Trading Agreements
Current metadata capacity	10	p. 25, 28	
Role-based access	5	p.31-35	See NH Network Implmentation plan
Resource allocation for Network content	3	p. 11-12	See budget justification
3. Collaborative Relationships (15)			
Data stewards	10	p. 36-40, 42-44	See Database Inventory and SNIP
Letters of support	5		See appendix G
4 Purpose and Need (10)			
Cooperative agreements	5	p. 40	See Appendix G&N for MoUs
Resource Sharing plan	5	p. 5, 10	See budget justification & 424A
5 Capability of Staff and Organization (10)			
Staff listed by talents	5	p. 44-45	See Appendix H
Defined roles related to plan	5	p. 13	See Appendix H
APPENDICES			
A. NH EPHT Program Logic Model	*		
B.NH EPHT Operational Plan	*		
C. 5yr Timeline of RFA Activities	*		
D. 5yr Workplan	*		
E. Well Water Action Plan	*		
F. Methods for AQ/Asthma & Radon/Lung Cancer			
G. Letters of Support & DES/DHHS MoU	*		
H. Staff List, Resumes & SJDs for vacant positions	*		
I. Schedule fo NH PHIN Activities			
J. Agency Organizational Charts	*		
K. NH Program Fact sheet			
L. Trading Partner Agreement			
M. Workforce Assessment			
N. List of Technical Advisory Board Members			
O. List of Collaborating Partners	*		
P. APEx Letter of Intent			
Q. PHASE Data Partner Agreement			
R. Organizational Charts			
S. Budgets			

* indicates an RFA element that CDC emphasized as very important

List of APPENDICES

APPENDIX A: Program Logic Model for NH EPHT

APPENDIX B: Operational Plan for NH EPHT

APPENDIX C: Five-Year Workplan and Measures of Effectiveness for NH EPHT

APPENDIX D: NH Laws Authorizing Data Access

APPENDIX E: NH Well Water Access Action Plan

APPENDIX F: Methods for Data Linkage Projects
                  1.AQ/Asthma
                  2. Radon/lung cancer
                  3. Arsenic/Health Effects

APPENDIX G: Letters of Support and DES/DHHS MOU

APPENDIX H: List of Staff and Resumes for NH EPHT

APPENDIX I: Timeline of Activities for NH PHIN Certification

APPENDIX J: Program Fact Sheet for NH EPHT

APPENDIX K: Communication Strategies for NH EPHT

APPENDIX L: Past Products for NH EPHT

APPENDIX M: List of Collaborating Partners within NH EPHT

APPENDIX N: Data Requests and Data Use Agreements for NH EPHT

APPENDIX O: List of NH EPHT Technical Advisory Board Members

APPENDIX P: Letter of Intent for Northeast EPHT Grantee Collaboration (APEx)

APPENDIX Q: PHASE Data Sharing Agreement

APPENDIX R: Organizational Charts

APPENDIX S: Budgets and Cost Allocation Letter

TABLE OF CONTENTS

EXECUTIVE SUMMARY

New Hampshire is well positioned to submit this application for five years of continued Environmental Public Health Tracking (EPHT) funding based upon its successful experience with prior EPHT projects, and more importantly, its well-designed plan for full implementation of a data exchange Network. Our understanding of the RFA purpose includes a clear imperative for grantees to redirect from state-elected priority areas, and move toward developing 'common content' for the national Network, rapid implementation of data transfer capabilities, demonstration of operational feasibility, and creation of client tools for data usage. NH is uniquely qualified to achieve these goals and exceed expectations due to the strengths of our application, which include a grantee access to state-level 'core content' data, early implementation of information technology, installation of PHIN messaging system, and a tradition of inter-agency resource sharing.

The NH application is structured into <u>eleven sections</u> that address the main elements of the RFA in a logical sequence. <u>Section One</u> discusses our operational plan and methods for achieving Network implementation, including a five-year timeline of activities, likely project limitations and realistic alternatives, and a description of our project design and nine measurable and time-phased objectives. <u>Section Two</u> discusses our approach to network content and provides a summary table of our progress on addressing the seven required Year 1 'core content' measures. <u>Section Three</u> presents our approach to the use of information technology for providing technological functions, such as moving content, standardization, automation and security protocols. <u>Section Four</u> discusses our communication strategies for delivering key national and state EPHT Program messages and information that address community concerns to targeted local audiences. <u>Section Five</u> presents our approach to network coordination for collaborating

with data owners to establish data sharing agreements and make appropriate data and information accessible on the State and National Network gateways. Section Six presents our approach to facilitating training for the State and local environmental health workforce and their partners on basic EPHT principles. Section Seven presents our approach to the development of a technical advisory group to guide the Network development process and interact with other key advisory groups. Section Eight presents our participation in the development of guidance documents and decisions within the National EPHT workgroups, such as Network Content, Standards and Network Development, Program and Marketing, and other workgroups and subgroups. Section Nine presents our approach to collaboration with State and National EPHT stakeholder organizations to identify common needs, promote resources, share information, and facilitate public health actions designed to improve the health of our communities. Section Ten presents our approach to program evaluation and how we will design, implement and publish a comprehensive program evaluation of all NH EPHT activities and lessons learned based on CDC evaluation guidelines. Section Eleven presents our approach to assisting with the Annual 'State of the National EPHT Program' Report in a manner that reflects the experiences of our Program.

Supporting the NH EPHT Program narrative is a detailed budget justification, a five-year budget estimate, and our inter-agency resources sharing plan. In order to provide appropriate detail, the narrative is also supported by a number of key appendices, hyperlinks, tables, and lists.

1.0   IMPLEMENTATION OF A STATE AND NATIONAL EPHT NETWORK

The following section describes the operational plan, design, and measurable objectives for achieving full implementation of the EPHT Network in New Hampshire.

1.1   Operational Plan and Methods

Over the next five-years, the <u>operational plan</u> will guide the NH EPHT Program on a strategic course from its present intermediate stage of network feasibility and data linkage pilot projects to the full implementation of an integrated environmental and health information system. Toward this aim, we will design, build, and operate a step-by-step process that turns isolated NH data silos into an interoperable EPHT data exchange system. We will expand our current network development capacity with new information technology (IT) components, additional environmental and IT support staff, forge an external IT contract for network development and maintenance, and cooperatively share resources with key State agencies. In addition, we will integrate with the national-level Network through EPHT workgroups working on common standards for content, metadata, and data exchange envelopes (e.g., PHIN-MS).

Expected <u>short-term results</u> of these activities include the ability of our individual stakeholders to access, visualize, and use better information via a state-national gateway and an interactive web portal. Expected <u>long-term outcomes</u> will be improvements in public health policy and health status of targeted communities (see Appendix A: NH EPHT Program Logic Model). A description of how our activities will accomplish full implementation is presented within the following sections on network content, network information technology, communication, collaboration, and cooperation. A table of the individual elements involved in State Network implementation is included within our operational plan (See Appendix B: Elements of NH EPHT Operational Plan).

As we progress toward full network implementation and integration, our operational plan and methods will be regularly evaluated for efficiency and effectiveness. This approach will include: 1) following the key guideposts of the RFA requirements and national CDC workgroup process; 2) tracking and achieving our measurable goals and objectives by appropriate use of our staff, program resources, and partnerships; and 3) continuing to explore, discover, and address the needs of our stakeholders. This approach will act as a map and compass system to guide us through the flexible development of a first-ever environmental and health data exchange network. Our specific underline program methods (activities) will include continued improvements to environmental health infrastructure, maintenance of cooperative partnerships, negotiation of formal data-sharing partnerships, production of physical 'network content' that is standardized across environment and health domains, development of information technology (hardware, software, tools, etc.) for data access and exchange, provision of web services for full utilization of the content, development of appropriate policies, and coordination of activities among data stewards and stakeholders. Aspects of New Hampshire that will assist us in achieving these objectives are: NH State government strengths, including our position as a Northeast state with a limited population size, a tradition of greater inter-agency cooperation, and experience with inter-state cooperation; and NH Grantee agency strengths, including existing infrastructure for tracking environmental and health data, mandated access to individual-level public health data sources, partial deployment of a pilot data exchange project using PHIN-MS, and a track record of achieving public health improvements.

A number of key readiness factors that position us for rapid implementation of the EPHT network. First, we have a four-year track record of EPHT program development, staff experience, and successful accomplishment of required activities. Second, we have direct, legislated

access to restricted public health data sets via our parent agency, the NH Health Statistics and

Data Management (HSDM). Third, we have inter-agency agreements and resource sharing plans

that tie us directly to the mission-critical goals of the NH Department of Environmental Services

(NH DES), NH Department of Health and Human Services (NH DHHS), and NH Office of

Information Technology (NH OIT). And fourth, our partner agency, NH DES, is already

exchanging data sets between the state and national level via the EPA Exchange Network

gateway.

1.2   Project Limitations and Alternatives

In regard to future limitations and difficulties, we expect that the technical development

of the automated data transfer network will be the primary barrier in New Hampshire due to the

recent re-structuring of our Office of Information Technology. We propose three solutions to this

problem: 1) hire three IT-related support staff, including the proposed IT System Development

Specialist, an IT/Data Analyst within the NH DHHS, and an IT/Data analyst within DES to build

the State Network in-house and communicate with our State OIT system; 2) Develop an external

IT Support contract with a vendor in order to ensure that the system is developed faster and to

provide ongoing maintenance to stakeholders; 3) Create a special DHHS account (class 27) to

pay for individual IT support on an ad-hoc basis.

In regard to past barriers, the NH Program has identified a number of key limitations and

potential difficulties during the past four years of EPHT planning and early implementation.

Fortunately, we have been able to resolve and develop alternative plans for achieving program-

matic objectives. In brief, the primary limitations have been administrative barriers to State-level

hiring and expenditure of funds. We have addressed these limits by providing strong justification

for hiring, and sharing existing staff positions with related agencies. We have also created

external-bid contracts to accomplish certain CDC-required program objectives, including the

Workforce Assessment, Policy Review and EPHT training. We plan to use similar alternative

approaches in order to ensure completion of the next 5-year activities. Detailed discussion related

to our approach in overcoming past barriers and limitations, as well as those we expect to arise in

the future, are included in each section of this application.

The 5-Year timeline below provides an overview of the activities and time-phased objec-

tives for the NH Program from FFY2007 through 2011. The specific activities and objectives are

described in greater detail in the following narrative sections. The table demonstrates our

understanding of the key program activities and the dates that they must be accomplished by

under the current RFA. Additional NH Program activities that describe our individual approach

to full implementation of the State Network are also included. The left side of the table lists

main program activities and the right side lists ongoing progression. Important RFA milestones

are noted in a blue font.

5-Year Timeline of RFA Activities for NH EPHT Program

State and National Activities – Year 1 8/06-7/07	Year2 8/07-7/08	Year3 8/08-7/09	Year4 8/09-7/10	Year5 8/10-7/11	Final Actions
Operational Activities					
Operational plan and methods	Measure progress	"	"	"	NH Network plan fully implemented
Content Development Activities					
CDC Network Content Workgroup	Add 1 Core	Add 1 Core	Add 1 Core	Add 1 Core	
Drinking water quality data sources					
Track 5 National Core Content areas	Track 6 Cores	Track 7 Cores	Track 8 Cores	Track 9 Cores	All core content measures tracked
Track 2 Optional Cores	"	"	"	"	
Propose 2 NH cores: 1) radon, 2) lung cancer.	"	"	"	"	
Compile metadata work and make available on State and National Networks	Compile metadata	State metadata query	State data set query	National data set query	Fully function-ing query system
Information Technology Activities					
Adopt PHIN standards	Update	Test	Update	Test	PHIN certified
Implement network AVR tools	"	"	"	"	
Develop IT infrastructure – purchase NH Server and software	Load NH Server	"	"	"	
Build web services portal	Update	Test	Update	Test	Portal working and used
Create role-based directory	Security	"	"	"	
Compile NH metadata	"	"	"	"	
Establish ability to broker queries and exchange data between data sources & web portal.	Test transfer capacity	Transfer 7 cores 9/30/08	"	Transfer 9 cores 9/30/10	All core measures transferred
Communications Activities					
Develop state level outreach plan & risk communication strategy	"	"	"	"	Messages targeted & tested
Coordination Activities					
Collaborate w/ data owners, stewards, TPAs, letters of support	"	"	"	"	Sufficient TPAs & agreements
Other Activities					
Facilitate training, EPHT 101	Courses	"	"	"	
Establish state tech advisory board	Meetings	"	"	"	
Participate in CDC workgroups	Standards	"	"	"	
Collaborate on public health actions	Actions	"	"	"	
Complete NH EPHT Progress Report	Report	"	"	"	
Collaborate on CDC Annual Report	Report	"	"	"	

1.3   Project Design

The NH five-year <u>project design</u> will build upon the results of our successful data exchange pilot projects, address the known challenges to early implementation, and manage the evolution of the network with measurable objectives that result in realistic, state-based activities. The <u>elements of our project design</u> include a clear operational plan and strategy as summarized in the previous section. A NH EPHT Program Logic Model is provided in Appendix A and illustrates the flow of activities leading toward our outcomes and impacts. Additional elements of the project design are described in the following sections of Network Content, Information Technology, Communications, and Collaborations.

The NH EPHT project will be located within a state public health agency with guidance from trained program planners, epidemiologists, and administrators who have experience in supporting the infrastructure for the linking and exchange of health information. Program operations will be supported by a shared resource plan for use of multiple assets such as direct federal funding from the CDC, indirect funding from NH State administrators and OIT agencies, as well as in-kind support/funding via cooperative partnerships with federal, State, local, APEx Rutgers Consortium, Northeast region EPHT partners, and other key stakeholders. Program activities will be achieved by the use of 6.5 FTE staff in NH DHHS, 1.50 FTE staff in NH DES, and additional support from cooperative agencies and an external contract for IT services.

Network development methods will include a Rational Unified Process, an interactive method for assessing system user needs, as well as information technology services for the installation and support of physical equipment and software. Program results will be assessed in terms of progress on measurable objectives, surveys of stakeholder needs and satisfaction, and the ability to provide data analysis support services to study environmental and public health improvements.

1.4 Measurable and Time-Phased Objectives

The NH Program has developed one main goal and nine (9) specific objectives that will be tracked in order to achieve network implementation. The theme for each of these objectives reflects a key element of the RFA and results in the phased development of a State-National Network for the automated exchange of environmental and health data. A detailed explanation of our multi-year plans and Measures of Effectiveness is available in Appendix C: Five-Year Work Plan. This appendix provides information on our nine objectives, a summary of the planned activities, inputs, outputs, and a detailed timeline. The list below provides a summary overview of these program objectives.

Objective 1: Develop content for the State Network that includes all 5 core measures, 1 optional measure, and 1 core measure added each year until the core content measures are transferred to CDC via an electronic network by 9/30/08, and all additional measures are transferred by 9/30/2010.

Objective 2: Develop the Information Technology aspects of the State Network for accessing and exchanging data on the State and national Network, including PHIN-MS installation, metadata creation, role-based access, AVR tools, and other key IT aspects, by July 2008, and fully by July 2011.

Objective 3: Make environmental and health data available on the State Network via data sharing agreements in place by July 2008, and improved user/stakeholder access by July 2010.

Objective 4: Make State Network data available on the National Network via data sharing agreements in place by July 2008, and improved user/stakeholder access by July 2010.

Objective 5: Develop and implement communications activities to promote key national EPHT messages to targeted audiences in order to address community concerns via needs assessments, risk communication strategies, impact assessments, and other techniques by September 2007.

Objective 6: Collaborate with environmental health agencies and EPHT stakeholders to identify common needs, promote resource sharing to advance the national EPHT program and facilitate public health actions to improve the community health by September 2007 and September 2009.

Objective 7: Conduct a comprehensive assessment of all tracking activities in New Hampshire, and based on this assessment develop a written report outlining lessons learned designed to implement the state-based EPHT network by July 2011.

Objective 8: Participate in national CDC workgroups by attending monthly calls, traveling to workshops, and producing relevant guidelines/materials on an on-going basis.

Objective 9: Collaborate with CDC to develop a written annual state of the national EPHT report as instructed by forthcoming directives on an annual basis.

2.0   NETWORK CONTENT

Access to required network content is one of our Program's key strengths. Due to a recent organizational move to the Health Statistics and Data Management section--the legislated NH authority for public health data storage, analysis and public release--our Program now has direct, legal authority to access all major public health databases and surveillance records. The content available includes: inpatient and ambulatory hospitalization data, cancer registry data, Behavioral Risk Factor Surveillance Survey (BRFSS) data, vital records data (birth, death, and fetal death), poison control data, and EMS/ambulance data (see Appendix D: NH Data Access Laws). In the near future, we will also access Automated Hospital Emergency Department Data (AHEDD), which receives electronic 'real-time' patient diagnosis data from four participating hospitals.

In regard to environmental content, our Program is housed in the same building as the NH DES, which eases the logistical difficulties involved with long-distance collaborations. Network content from databases within NH DES are easily accessed due to an MOU between our two agencies. This MOU also supports two part-time DES positions involved with data access, analysis, and data-sharing liaison activities.

Over the past four years, we have made significant progress toward identifying, access-ing, and preparing data for incorporation into the State and National EPHT Networks. In October 2005, NH EPHT completed an in-depth inventory of data sources for our three priority content areas of air quality and asthma, radon and lung cancer, and arsenic in drinking water and bladder cancer (NH DBI Report.pdf).   For this inventory we assessed each dataset for content, metadata, quality, availability, and accessibility and resulted in a 'gap analysis' of missing NH environ-mental health content, thus providing the basis for a data acquisition plan. This inventory also provided a foundation for the development of data linkage demonstration projects (NH EPHTde-monstrations.html).

In the database inventory, we identified and evaluated fifteen (15) individual databases, some of which will comprise the initial content of the State Network. As outlined in Table 2-1 below, the results of our database assessment illustrates our progress on automating the Network to be truly standardized, integrated and web-based.

Table 2-1. Progression of Content Access on the NH EPHT Network, January 2006

DATABASE Name	Inventory	Accessed	Ongoing Collection	EPA/PHIN Compliant	QA/QC	Integration	Automated	Web Posted	Summary Stats
DES Drinking Water			monthly					One-Stop	
DES Fixed Facility			monthly					One-Stop	
DES Beaches			daily					One-Stop	
DES Outdoor Air Quality			daily						
UNH Outdoor Pollen			weekly						
DES Radon in Air			annual						
DES Private Drinking Water									
Hospital Discharge Data									
DHHS hospital data AHEDD			daily						
NH Cancer Registry			annual						
NH Behavioral Risks BRFSS			annual						
DHHS Birth Query WRQS			annual					DHHS	
DHHS Vital Statistics			annual						
Manchester School STEMS			daily						
DHHS Biomonitoring Data			seasonal						
Network Progression ------>	early stages			mid-stage -->				network complete -->	

- Not yet available (barriers)
- Partially completed
- Completed
- Not yet assessed

2.1 Participate in the CDC Network Content Workgroup

The NH EPHT program will continue participation in the EPHT Network Content work-group and subgroups during the course of the 5-year grant period. Because of their diverse range of expertise among our epidemiologists and content areas, we will also be active participants within all other subgroups (i.e., water, air, lead, asthma, cancer, birth defects). Our main role will be to clarify our state-level data limitations and assist with defining the appropriate core EPHT measures, data formats, standards for ensuring data quality, collection measures, aggregation methods, and adopting the standards for nationally consistent data. Our three epidemiologists: John Colby, PhD; Misty Richard, PhD, MPH; and Megan Tehan, MPH, have extensive experience analyzing environmental and health data sets, including outdoor air quality, indoor radon, vital statistics (birth and death), lead poisoning, and demographic/socioeconomic data.

Because of their expertise, we believe our staff to be uniquely qualified to assist the Network

Content Workgroup in developing and adopting standards for nationally consistent data and

making it available on the state network in a standardized format.

2.2   Identify Water Quality Data Sources

Content regarding drinking water contaminants was well documented in our 2005 Data-

base inventory and includes public and private drinking water data sources and arsenic in

drinking water data sources. From that inventory process, we've learned that: 1) NH DES are

stewards of the state ambient water quality data, municipal water quality data submitted by local

municipalities and community wells, and private well water data from testing performed by the

NH DES laboratory and purchased by private citizens; 2) data includes all potential contaminants

that are tested for by NH DES (http://www.des.state.nh.us/ws.htm); 3) NH State drinking water data

is currently reported electronically from NH DES to the national level via the EPA Exchange

Network; 4) both ambient water quality data and municipal drinking water data are presently

available via the NH DES One-Stop query system (http://www2.des.state.nh.us/OneStop/); and 5)

content on public drinking water datasets is available for exchange with both the State and

National Networks. In regard to access to non-public drinking water content, we are currently

limited in our ability to access 'privately-owned' drinking water data (i.e., wells) due to legal

restrictions. However, NH EPHT is currently in the process of developing a first-in-its kind data

request to the NH DES laboratory for internal access to this data. Additionally, in order to attain

access to well water data, Laura Holmes (EPHT Liaison, DHHS) and Vincent Perelli (EPHT

Liaison, DES) developed an action plan for access to well water data from both NH DES lab and

commercial laboratories (see Appendix E: NH Well Water Access Plan). Collaboration with the

regional US Geological Survey (http://nh.water.usgs.gov/) to develop an atlas of "modeled" well

water contaminants within the state is an alternative approach to avoiding legal barriers to private well water data that we have initiated. See Appendix F: Methods for Data Linkage Projects for a summary of the Arsenic and Cancer Project.

In order to assess our readiness to exchange drinking water and health data, NH EPHT Program designed a pilot project in November 2005 and evaluated the feasibility of electronic exchange of data between the State environmental and public health agencies via PHIN-MS. The written implementation plan detailing the exchange of drinking water data from NH DES and bladder cancer data from NH DHHS has been completed by Daniel Burleigh, Systems Development Specialist in NH OIT and is available at the following location (NH Pilot Data Exchange.pdf). The key challenges discovered during the design of this pilot project include standardizing bladder cancer data and developing an inter-departmental agreement on the ability to share previously restricted or isolated data sources. In conclusion, NH EPHT has assessed the utility of ambient and municipal water quality data for incorporation into the EPHT Network and found them to be viable for incorporation into the Network. We foresee few additional difficulties making those datasets available on the State or National Network.

2.3   Improve Network Content to Ensure State-National Interoperability

The NH EPHT Program has successfully assessed existing environmental and health data that reflect New Hampshire's priority needs of asthma and air quality, radon and lung cancer, and arsenic in drinking water and bladder cancer. This information was compiled into a 2005 Database Inventory Report (NH Database Inventory.html) and provides a comprehensive assessment of the systems that track environmental and health data at NH DHHS and NH DES and a point-in-time evaluation of the quality and availability of datasets that we intend to track via the State Network and exchange with the National Network. In addition, it summarizes the current

IT infrastructure and architecture involved in the planned exchange of data between NH DHHS and NH DES. As of September 2005, nine (9) tracking systems have been assessed. These include: Criteria Air Pollutants, Radon 5, NH Municipal Drinking Water Database, NH Hospital Discharge Database, NH State Cancer Registry, NH Emergency Department Syndromic Surveillance Database, NH Birth Registry, NH Death Registry, and NH Behavioral Risk Factor Surveillance System (BRFSS). All First Year Core Measures are contained within the systems evaluated. In addition to tracking the national core measures, NH EPHT Program will track State priority measure of radon.

At the present time, NH EPHT Program epidemiologists have performed data linkage demonstrations between radon data and lung cancer data. We are also currently performing data linkages between air monitoring data and ambulatory outpatient data to assess associations between exposure to air pollution and asthma. The ability of the NH EPHT Program to track these datasets and make them available on both the State and National Network varies depending on ownership of the data and the level of identifiable information. Most environmental data content housed in NH DES is available to the public via NH DES One-Stop (http://www.des.state.nh.us/OneStop.htm) and we expect few difficulties in making that data available on both the State and National Networks. Environmental data sources that identify an individual or individual residence, such as well water data or household radon data, may be more restricted. Data that is personally identifiable will need to be aggregated to a higher spatial level (e.g., town, zip) in order to make it available to the public. Within those guidelines, we do not anticipate barriers to making de-identified data for ozone, particulate matter and municipal water quality accessible and available on both the State and National Networks via role-based access.

Public health datasets housed within NH DHHS are strictly protected from public access, especially data that is personally identifiable. NH EPHT Program staff has unrestricted access to the core measures data, however, in order to make health data available on the State and National Networks, the NH EPHT Program will develop data sharing agreements with data stewards to make aggregated data and/or pre-linked datasets available to the public and make data of smaller resolution available to authorized users via role-based access.

2.3.1 Activities to Make Core Measures Available and Accessible on the EPHT Network.

Core measures will be tracked and transferred in accordance with the proposed RFA timeline and from recommendations from the Network Content Workgroup. We will adopt these recommendations, and develop additional measures, to be reflective of the needs of our stake-holders in the development of the State Network.

Core measures will be tracked and made available on the State and National Networks according to the timeline below:

	Core Measure	Begin tracking by:	Make available on State and National Networks by:
YEAR 1 Core Measures	Ozone	July-06	September-08
	PM2.5	July-06	September-08
	Key water contaminants	July-06	September-08
	Birth weight	July-06	September-08
	Asthma Hospitalizations	July-07	September-08
	Myocardial infarction hospitalizations	July-07	September-08
	Cancers	July-07	September-08
Measures by Sept. 2010	Child blood lead levels	July-09	September-10
	Birth defects	July-09	September-10
New Yearly Core Measures	New Year 2 core measure	July-07	July-11
	New Year 3 core measure	July-08	July-11
	New Year 4 core measure	July-09	July-11
	New Year 5 core measure	July-10	July-11

Core Measures: PM2.5 and Ozone

NH DES Air Resources program currently tracks the core measures of fine particulate matter (PM 2.5) and ozone levels. We will track the core measures of PM 2.5 and ozone by July 2006 and will be able to make those datasets available on both the State and National Networks by September 2008.

The NH EHTP Program has been using both PM 2.5 and ozone data from NH DES monitors for a pilot project linking air quality and asthma hospitalization data. This project is an ecological-level study examining the link between air pollution levels and asthma emergency department hospitalizations. See Appendix F: Methods for Data Linkage Projects for a summary of the Air Quality and Asthma Project. Based on this analysis, we will identify demographic groups and geographic regions at greatest risk of asthma exacerbation events in response to high levels of air pollution. This project has allowed NH EHTP staff to explore and become familiar with the layout, purpose, use, history, quality, etc. of the data, as well as develop relationships with data stewards and experts.

For State and National Network implementation, we will provide standardized and formatted fine particulate matter (PM 2.5) and ozone monitoring data electronically transferred from NH DES, identified with the geocode and exact location of the air monitor. The base dataset created for the pilot project will provide a model for this standardized data. We will work toward creating the capability for user defined geographic locations (towns, hospital service areas, counties, etc) to be dynamically assigned to a NH DES particulate matter level based on geographic distance and population-weighted centroids. An existing MOU between NH DHHS and NH DES lays the groundwork for access and permission to transfer each of the air quality core measures described above (see NH DHHS-NH DES MOU in Appendix G:

Letters of Support). A formal data sharing agreement will be developed, agreed upon and signed

by NH EHTP and the NH DES Air Resources Division, Technical Services Bureau.

Additionally, the State Network will also track and make available PM 2.5 and ozone

levels using data supplied by the Environmental Protection Agency (EPA). This data has been

developed and will be made available through the PHASE project, a multi-agency data exchange

between CDC Environmental Health Tracking Branch, EPA and three state EPHT grantees (i.e.,

NY, ME, WI). The PHASE project team concluded that the air data most useful for environ-

mental health surveillance is the combination of air quality monitoring data and modeled air

quality data, integrated using complex statistical methods (see Appendix Q: PHASE Data

Sharing Agreement). This data is available for locations east of the Mississippi by grid cells of

12 square kilometers for calendar year 2002 and by nature of originating from a single data

source, will be standardized when it is received. An existing data sharing agreement between

CDC, EPA, and state grantees delineates access and allowed use of this data.

Core Measures: Water Quality Data with Key Contaminants

As mentioned in Section 2.2, the NH DES Water Resources program tracks drinking wa-

ter quality data from municipal and community water sources as required by the federal Safe

Drinking Water Act and state rules applying to public water. Most of the information collected in

the database is required for federal reporting to EPA's Safe Drinking Water Information System

(SDWIS). NH DES Water Resources program also tracks ambient water quality data. This data

is public information and is available on the NH DES Environmental Monitoring Data ware-

house at the NH DES One-Stop website (Environmental_Monitoring_Query.aspx). Municipal

drinking water data from this data system is a primary data source for the NH EPHT Program's

pilot data exchange project (NH Pilot Data Exchange.pdf). Both municipal and ambient water

quality data will be tracked by July 2006 and made available on both the State and National

Networks by September 2008.

Regarding well water data from water tests analyzed and recorded by the NH DES labo-

ratory, the NH EPHT Program will employ a data sharing agreement with the NH DES labora-

tory in order to gain access to and track private well water data by July 2007, and make

appropriate data available on the State and National Networks by September 2008.

Core NH Measure: Radon in Household Air

Because radon exposure is a key concern identified by our EPHT stakeholders and util-

izes existing linked data sets, the NH EPHT Program will be including this indoor air contami-

nant as an elective content measure. As indicated in our budget and resource-sharing plan,

tracking of radon and lung cancer will require a small investment of staff time and continued

BRFSS survey data collection. Other New England EPHT grantees have also expressed interest

in tracking radon via a multi-state project agreement. In regard to the content and quality of the

data sets, the NH Radon database contains results of approximately 19,000 residential radon tests

carried out statewide between 1987 and 2006. The data standards for this database meet QA/QC

protocols approved by EPA. Each record is identified by street address, which will enable

geocoding and GIS analysis. EHTP has used the radon dataset in its pilot project designed to

heighten awareness of radon as a public health hazard. The project has given EHTP staff the

opportunity to become familiar with cancer registry data, and to improve data standardization

methods with the NH Radon Program.

The State Network will provide standardized and formatted radon data electronically

transferred from the NH DES Radon Program and identified by geocode or a small area grid to

estimate geographic location. The base dataset created for the pilot project described above will

provide a model for this standardized data. The NH EPHT Program will work towards creating the capability for user defined geographic locations (towns, hospital service areas, counties, etc). An existing MOU between NH DHHS and NH DES lays the groundwork for data access to and permission to transfer various radon measures.

Core Measures: Asthma Hospitalizations and Cardiac Hospitalizations (i.e. Acute MI)

The state-level dataset for hospitalizations resides within the NH Hospital Inpatient/Outpatient, Ambulatory and Discharge database. As a result of our Program's integration into HSDM, our Program epidemiologists have access to all administrative health datasets in NH DHHS, including hospitalization data. As a result, we will track measures of asthma hospitalizations and acute myocardial infarction hospitalizations and make them available on the State and National Networks by September 2008.

The State Network will provide standardized and formatted de-identified case-level asthma and acute myocardial infarction hospitalizations, utilizing both inpatient and ambulatory datasets, with demographic fields attached, including age, sex, town name, zip code, source of payment, hospital name, and discharge date. For the inpatient data, two additional fields will be used: source of hospital admission (e.g. emergency room, physician referral, transfer) and type of hospital admission (i.e., emergency, urgent, elective). Data will be geocoded with latitude and longitude coordinates or linked to shape files for geographic polygons (e.g., zip codes, hospital service areas). Resources will be allocated to acquire geocoding software and updated address databases with geocodes or geocoding services. Additionally, we are developing a validated methodology and algorithm to de-duplicate hospitalization data to allow calculation of hospitalization rates for the population.

Enhancements of our current pilot project using ambulatory hospitalization and air quality data will include tracking the relative risk and attributable fraction of asthma and acute MI hospitalizations in relation to air quality measures (see Appendix F: Methods for Data Linkage Projects). With this project, our Program will also explore the use of the case-crossover methodology described and documented by the PHASE Project.

Core Measure: Cancer Incidence

Cancer became a reportable disease in New Hampshire in 1985, and for almost 20 years the NH State Cancer Registry (NHSCR) (NHCancer Registry) has been charged with identifying all new cases of cancer occurring among NH residents. NH HSDM has overall responsibility for the NHSCR, which it funds through a state contract with Dartmouth Hitchcock Medical Center. A cancer epidemiologist is staffed in the HSDM and serves as data steward. In our capacity as a Program within HSDM, we will track all RFA referenced content areas for incidences of hematopoietic (blood cell) cancers, central nervous system cancers, childhood cancers, bladder cancer, leukemia and non-Hodgkin's lymphoma by July 2007 and make the data available on both the State and National Networks by September 2008 (see Appendix G: Letters of Support).

Our Program has full access to case level cancer incidence data from the NHSCR. To date, staff members have carried out two projects based on ecological-level data. The first was EPHT's Radon-Lung Cancer Project, a risk communication tool intended to heighten awareness of radon as a public health hazard. The latest version was developed in collaboration with NHSCR for presentation at the National AACCR. The second project employing cancer incidence data was a cancer cluster investigation for the western border City of Claremont, NH in response to a request from the NH Office of the Governor.

Core Measure: Birth Weight

The NH Division of Vital Records Administration (NH Vital Records) in the NH Department of State (DOS) collects birth weight data for New Hampshire. NH EPHT epidemiologists have access to BVR datasets by virtue of their location within HSDM, which has an MOU with NH DOS permitting access to Vital Records data by HSDM epidemiologists. In order to make the data available on the State and National Networks we will negotiate a data sharing agreement between our Program and NH DOS specifying role-based data access for authenticated users. With the data sharing agreement in place, the State Network will track birth weight data by July 2007 and make the data available on both the State and National Networks by September 2008.

The State Network will provide nationally consistent de-identified case-level birth weight data to the National Network according to specifications developed by the Network Content Workgroup. Data will be geocoded with latitude and longitude coordinates or linked to shape files for geographic polygons (e.g., zip codes, hospital service areas) to allow for straightforward and accurate mapping and other GIS capabilities. NH EPHT Program will have considerable input for the workgroup on this measure by virtue of the experience and expertise of its epidemiology staff. Dr. Misty Richard has recently completed her dissertation that employed GIS methodology linking socioeconomic status and birth outcomes. Dr. John Colby has more than twenty years experience in research on infant mortality, low birth weight, and other perinatal phenomena using NH Vital Records data.

Core Measure: Childhood Blood Lead Levels

The NH Childhood Lead Poisoning Prevention Program (NH CLPPP.htm) within NH DHHS tracks childhood blood lead levels and residential orders of lead hazard reduction. We

will develop a data sharing agreement with NH CLLPPP in order to access and track child blood lead levels by July 2009 and make available on the State and National Networks by September 2010. We have also discussed storing the lead poisoning dataset on the EPHT server in order to improve access and security for both entities (see Appendix G: Letters of Support).

Core Measure: Birth Defects

NH Birth Defects Registry (BDR) at Dartmouth Hitchcock Medical Center collects birth outcomes and birth defects data for New Hampshire, and is one of only seven CDC-funded birth defect registries in the nation. The NH BDR was initiated nearly five years ago and has been collecting birth defects data since 2003. The birth defects data will be available on NH's Electronic Data Warehouse in 2007. Our access to the EDW will enable us to track birth defects data beginning in 2008 and make it available on the state network by 2010. The NH EPHT program and the NH BDR have a strong collaborative relationship and are mutually supportive of each other's activities (see Appendix G: Letters of Support).

2.4   Compile Metadata on Content and Make it Available

As mentioned earlier, we completed an inventory of existing environmental and health databases in NH DHHS and NH DES. For that inventory process, we developed an initial assessment of metadata, using a metadata creation tool adapted from the EPHT grantee for the State of Maryland, and gathered data elements in our priority areas of asthma and air quality, radon and lung cancer, and arsenic in drinking water and bladder cancer. The metadata overview is available in our Database Inventory Report on page 24 (DBI Report.pdf) and is compiled in an MS-Access database.

NH EPHT Program staff have been participating in the EPHTN Metadata Registry Team, and in March 2005 participated in the creation of the EPHTN Metadata Core Template V1.0.

Last year, the EPHTN Metadata Core Template V1.0 was created by the Metadata and Data Quality subgroup of the Standards and Network Development Workgroup. We will adopt this template as the standard for creation of NH EPHT metadata.

In order to find relevant data within the State Network, we will create a tool to identify and describe the information within the data sets in a way that is standardized and convenient to the user. Based upon the lessons learned by the Metadata subgroup within the national SND workgroup, the NH EPHT Program will develop network metadata tools that reflect the evolving national network. Specifically, the State Network will make use of the Metadata Tool Vision (http://www.ephtn.org/mambo/C) to guide the process of developing a State-based tool that reflects the needs of the national level EPHTN. The State Network project will also ensure that any metadata tool reflects the requirements outlined in the Federal Geographic Data Committee's guidelines on metadata (www.fgdc.gov) as indicated in the EPHT Metadata Core Template.

The most significant Metadata challenge will be to standardize the data dictionaries between NH DES and DHHS in order that search keywords can be used to discover relevant data (e.g., place, time, contaminant, etc.) within either system. In this way, users of the system will be able to determine which data sets exist that pertains to their concerns. It is expected that the PHIN-MS messaging system will be able to extract data from various data sources in a manner that ensures comparability. We plan to study the EPA Exchange Network to determine how they achieve standard Metadata terms across various data sources.

In order to accomplish our goals regarding the compilation of metadata and making it available on the State and National Networks, the NH EPHT Program will hire a 1.0 FTE Network Developer position with prior IT development experience to serve as the metadata creator/maintainer, as well as coordinate other IT needs of the NH EPHT program (see Appendix

H: List of Staff & Resumes for NH EPHT). This staff member will also work with the epidemi-

ologist most familiar with a particular dataset to ensure that all metadata databases are available

on the State Network and guarantee that the metadata be searchable via a query system.

3.0   INFORMATION TECHNOLOGY (IT) ACTIVITIES

The hardware, software, and technical expertise that allow for the flow of electronic in-

formation are essential aspects of evolving public health surveillance systems. The addition of

an environmental component to this public health network increases the technical difficulty of

standardizing and linking data.   The following section describes three main IT components used

by the NH Program to solve this challenge, including: 1) a data transfer envelope called PHIN-

MS; 2) our plans for analysis, visualization and reporting of network content; and 3) other

functions performed by the system.

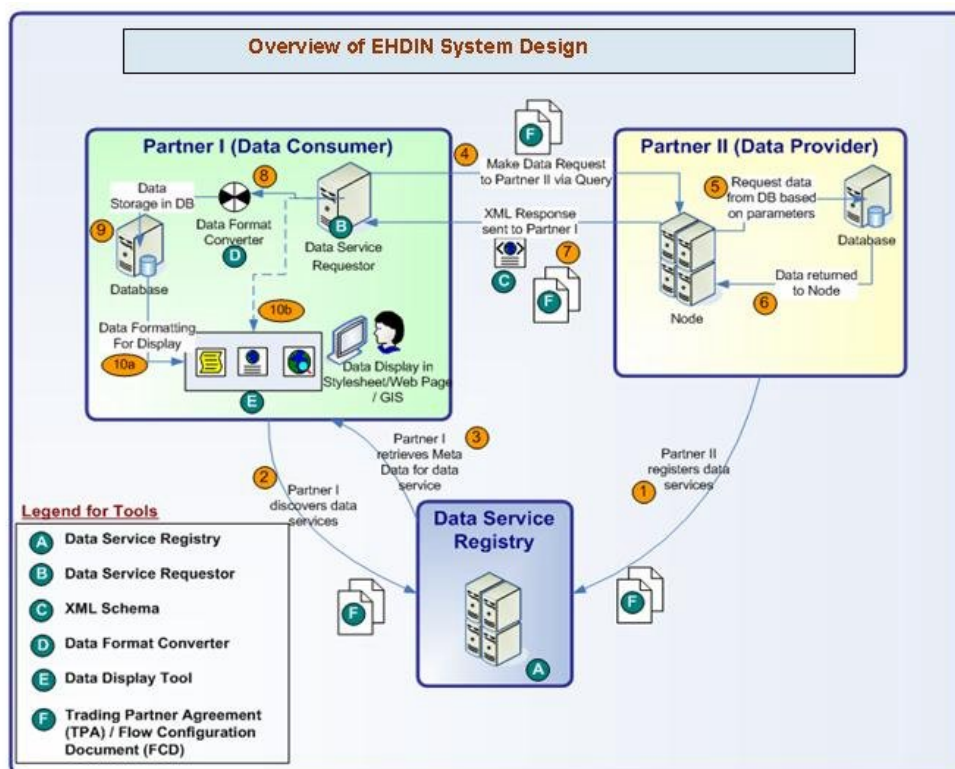**Figure 3.1 – Overview of the NH State Network**

Figure 3.1 above provides an overview of the various independent IT elements in relationship to each other. This diagram identifies the two main partner entities: the data consumer and the data provider, and the tools and actions they will utilize to accomplish the data transfer. Additional discussion of the NH state information technology system can be found in the NH State Network Implementation Plan (NHNIP.pdf).

3.1   PHIN Components on the NH State Network

The evolving national-level Public Health Information Network (PHIN) is a concept, a process, and a set of IT components. The NH Department of Public Health Services is currently the lead agency for implementing PHIN in NH and is currently at the installation and certification stage. We have a six–member PHIN workgroup consisting of staff from various departments interested in applying PHIN to their individual needs.

Presently, the NH EPHT program has obtained all the necessary hardware and software to implement a laptop-to-laptop pilot project to test the transfer of data via PHIN; this will make the NH EPHT program the first of the departments to implement PHIN in NH. Figure 3.2 illustrates our initial transfer involving a PHIN-MS enabled exchange of environmental and health data between DES and DHHS, and will be completed by the end of June 2006. This IT function is viewed as a 'machine-to-machine' intra-state exchange of data. After this transfer, we will install PHIN-MS on a server and be in a position to transfer data outside of the state agencies. (Refer to Appendix I for a schedule of PHIN activities).

Figure 3.2 – PHIN-Enabled Data Exchange Process

Proposed Data Exchange between DES & EHDIN Systems
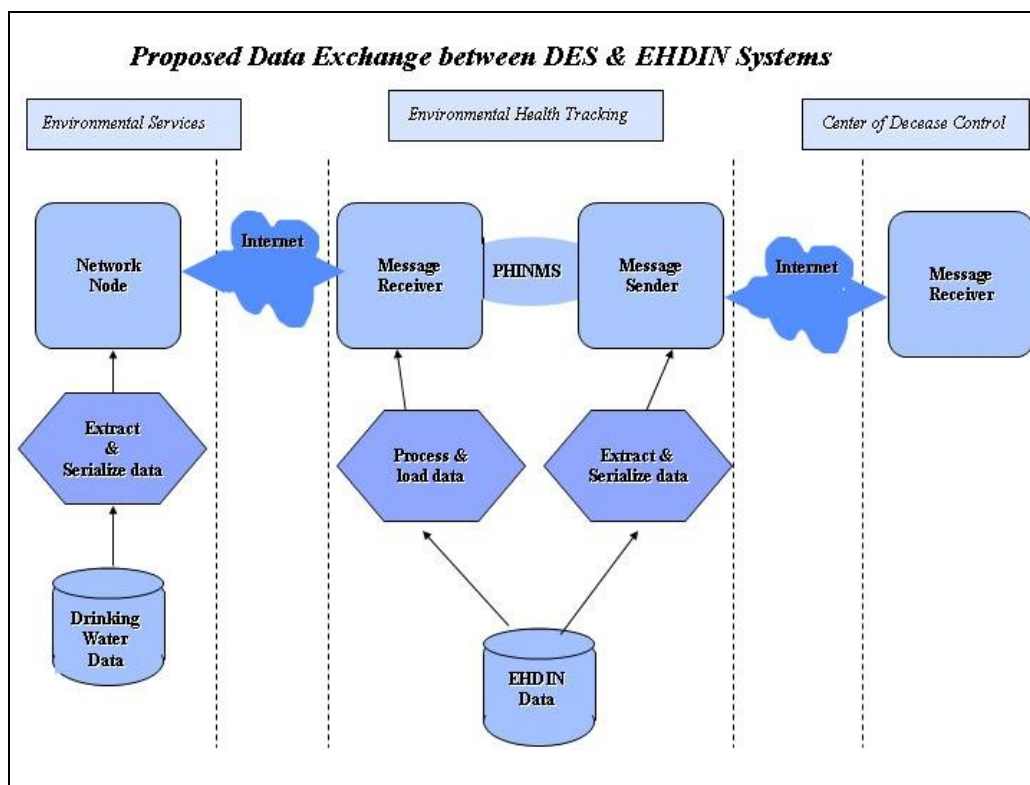
For transfer of data to clients who have an active data sharing agreement with the State Network, we will use PHIN-MS to allow partners to "log on" and extract the data from the State Network. For our CDC partners, we will allow the registered machine to access our system and extract the data. The details of when access will be granted and how it will be allowed will be explicitly described in a data sharing agreement between our Program and the CDC.

3.2   Analysis, Visualization and Reporting (AVR) Activities

The standard analysis, visualization and reporting (AVR) formats, interfaces and tools provided in the National EPHT Network AVR Toolkit will be implemented in the State Net-work, thus providing a standard functionality across the National Network, as described in Section 4.5.3 of the State Network (NH EHDIN) Implementation Plan (NHNIP.pdf). The State Network will include many data manipulation tools, accessible via a web-based gateway, to

facilitate AVR of environmental and health data. Simple tools for manipulating data, such as a

query tool, will extract data of particular interest to the user and provide it in a usable format.

Complex tools for manipulating data, such as data analysis and transformation capabilities, will

also be available on the State Network. Other AVR functionalities of the State Network will

include reports calculating incidence or prevalence rates, the ability to calculate confidence

intervals and other statistical measures of interest, various data aggregation layers (years, town,

HSA, county, zip code, all females etc), and user-customized report building. Some of the AVR

mapping capabilities which will be integrated into the State Network are pre-defined maps with

landmarks, color and variable groupings, and with the ability to add/remove labels, to dynami-

cally change geographic or time aggregations, and view dynamic maps with the ability to define

user-selected zones of interest. Examples of some of these capabilities can be seen at the US

Census website (factfinder.census.gov), the NH Birth Query tool (NHBirthQuery.htm), NH DES

One-Stop (DESOneStop/), and ATSDR (http://www.atsdr.cdc.gov/hazdat.html). The primary

exchange of data will be through the PHIN message queues; however, for AVR capabilities,

once in place, any authorized client/user will be allowed to request for data to be displayed to

them in multiple formats, e.g., Excel format for data analysis, spatial format for GIS analysis,

XML for purpose of XLS style sheets.

NH EPHT staff epidemiologist, Misty Richard, PhD MPH, has experience working with

GIS and will use ESRI software products to design and implement visualization tools for the

State Network. In her dissertation project, Dr. Richard used ESRI products to link socioeco-

nomic census data to birth outcome data, using the maps to illustrate her model. NH EPHT staff

epidemiologist, Megan Tehan, MPH, has been a participant in the PHIN AVR workgroup, which

convenes bi-monthly via conference call. This workgroup provides many resources pertaining to

topics ranging from dashboard design to epidemiological functionalities and references to current guides and references such as the December 2005 report "Current Status and Desirable Functionalities of State Web-based Data Query Systems: A Report of a Review of World Wide Web Sites and a Consensus Process" by Friedman and Parrish.

3.3   Access and Exchange of Data via PHIN

3.3.1   Development of PHIN-Compatible IT Infrastructure on the State Network

The primary exchange of data on the State Network will be through the PHIN message queues, and once in place, any authorized system (machine) will be allowed to request data. Via the message queue, the State system will execute a database procedure that will retrieve the data. Then the PHIN message queue will deliver the message back to the authenticated user. A data discovery tool will allow authenticated systems to access our State Network and will allow authenticated users the ability to extract different XML queries.

Our Program will use the Data Provider Node in order to receive Data Service Requests, generate XML payload files, and transfer the XML payload files to the Data Consumer. Technologies that have been identified for potential reuse from the New Hampshire capabilities and Exchange Network include the Node, Shared Schema Components (SCCs) and Core Reference Model, Environmental Data Standards, NAAS Security Process, and XML schemas from the EPA Exchange Network.

3.3.2   Development of State Network 'Security' Controls for Network Products

The State Network server will be located on NH's DMZ (demilitarized zone). Figure 3.3 below provides an outline of the security system supporting State Network via the NH OIT technical infrastructure. As indicated below, the DMZ has two firewalls, one that separates the DMZ from the outside world and a second to separate the DMZ from the internal network.

Communication between the State Network server on the DMZ and the internal database server is secured through a set of rules for access and limitations. During deployment, the software will first be installed on the QA server for internal testing purposes. Once the testing on the QA server is successfully completed, the software will be deployed to the Production server.

Figure 3.3 – Technical Infrastructure for Security
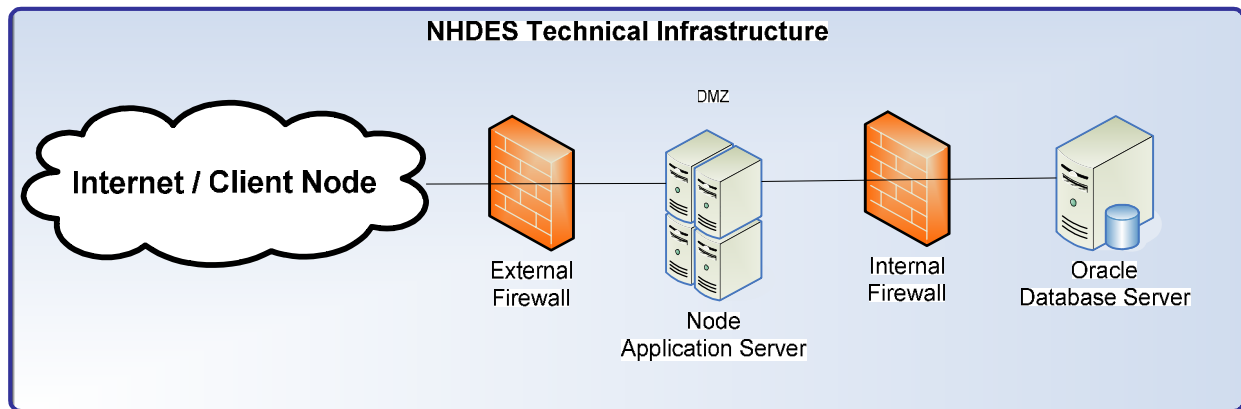
The security components of the State Network will be based on national standards and technologies such as XML Encryption, XML Signature, XKMS, WS-Security, and XML Firewall. The State Network will be built with the following key components of NAS Services security for user authentication: Web Service Interface, Network Authentication Service, Network Authorization Service, User Identity Management, Policy Management, Intrusion Management, and Vulnerability Management.   The National Institute of Standards and Technology (NIST) website (http://ts.nist.gov/ts/htdocs/210/its.htm) provides numerous resources for IT standards regarding diverse areas such as encryption of data and security measures for exchange of data. The NH EPHT program will utilize NIST-developed standards during the development of the data exchange state network.

Security Authorization control, the mechanism for obtaining consent for the use and disclosure of health information, will be based upon role-base/user-based access. Data authentica-

tion will occur through at least one of the following methods: check sum, double keying, message authentication code, and digital signature. Entity authentication will include automatic logoff after a predetermined time of inactivity, unique user identifier, password, personal identification number (PIN), and a telephone callback procedure (method of authenticating the identity of the receiver and sender of information through a series of "questions" and "answers" sent back and forth establishing the identity of each).

Standards also exist for users/receivers of data from the State Network. If an entity uses communications or network controls, they must also have certain security standards, some of which include integrity controls, message authentication, access controls, encryption, and an audit trail. This high level of security provides several advantages: the State Network will rely on company standards for all security related tasks, the State Network will be highly extensible and can be extended by implementation of other supporting products such as public key infra-structure (PKI), and the State Network will support Single Sign-On (SSO). With SSO, users can authenticate at a single point and have access to multiple queries.

3.3.3   Establish a Web-based Portal

As discussed in our State Network Implementation Plan, we have developed a state net-work design that incorporates a person-to-machine web based portal for accessing core content areas. This portal will allow users to access the specific type of health and environmental data that is relevant to their interest and role. New Hampshire has already built two web-based portals that allow users to access user-specific content: the NH Birth Query and the NH DES One-Stop.

We will have metadata and controlled vocabulary available on the State Network in a searchable format and be provided via role-based user access. The ability to search and obtain

the metadata will assist the users in the linkage, analysis, and utilization of EPHT data available on the network. In regard to the specific steps towards development of a data manipulation function within the State Network, we are in the preliminary phases of defining those specifications. The steps below are an outline of the proposed process. Step One: Define the content to be manipulated by specifying the data formats for inputs; Step Two: Develop the data manipulation technology that will act as a tool for query or analysis functions; Step Three: Load the tools onto the NH EHDIN system; Step Four: Test the ability of the data manipulation tool to handle data; Step Five: Develop a system for coordination that can evaluate new tools, set standards for user interface, documentation/support materials, and interoperability.

In the early stages of its development, the State Network will integrate existing data query functions as a preliminary step to the development of its own data manipulation function. For example, our State Network web portal may direct users to the NH DES One-Stop website in order to extract needed data. In the later stages of development, the State Network will create its own internal online data manipulation function that integrates the content of environmental and health data, with tools for changing data (similar to One-Stop or the Birth Query), and develop a system coordination component for maintaining relevance to partners and users.

3.3.4   Implement Role-based Access

Within the State of NH we are required to build systems that use database security where the user authenticates back to a database. Once a valid PIN/password is entered into the database, the user will be allowed or denied access. At this point of positive authentication, the user/client is allowed access based upon the role or profile they have been granted. Upon request to authenticate, the system will automatically make a record of the attempted authentication by recording the user's credentials, the time and date stamp of the request, and the IP address. All

of the data the clients will be retrieving or viewing will come from a database table. Based upon their credentials, it will be possible to allow or disallow table access and column access per individual client. Currently a PIN/password system is in place and being used by NH DES as a production application with nearly 1000 registered users. This system uses role-based security and has the user's role stored within a database table. Upon authentication, the user then has access to their role, thus, it is not an application security model. This application currently meets or exceeds the EPA CROMERR rule, and is currently being deployed by two NH DES bureaus.

3.3.5 Establish Ability to Broker Data Queries

Currently, all of our data sources reside in the NH Wide Area Network (WAN), and we do not anticipate the need to go outside our secure State WAN to retrieve any additional data sources. It is our intention to retrieve as much of our data as possible via PHIN-MS queues. Our State Network will request data from our partners and pull the data from different data sources (e.g., NH DES Air Monitoring program, NH DES Drinking Water program). The DHHS PHIN-MS will pass a message to the NH DES PHIN-MS requesting a particular dataset. The NH DES PHIN-MS installation will act as a broker to receive the message, decrypt it, and return a DOT.Net program to initiate the response back to the State Network.

The State Network will have the standard WEB query capability utilizing as much as possible of the NH DES model query base system, meeting much of the public's lower level queries through this method. The State Network will also have a Data Exchange Toolkit, which will enable the State Network to respond to a multitude of data request formats, and allow clients to receive data back in the format that is needed.

4.0   COMMUNICATIONS

4.1 Develop an Outreach Plan for Key National EPHT Messages

Throughout the stages of State and National network implementation, a variety of risk communication messages will be developed and communicated to disparate target audiences such as health and environmental professionals, advocacy groups, legislators, researchers, and the general public. NH EPHT Program staff member, Laura Holmes, is an active participant in the Program Marketing and Outreach Workgroup (http://www.ephtn-pmo.org/mambo/index.php) and related subgroups. These groups have produced many communication materials such as Network messages, issue briefs, surveys and Fact Sheets, that are targeted to network stake-holders for use by State grantees.

For example: 1) the PMO Professional and Technical Associations Subgroup has created a Sample Communication Plan (http://www.ephtn-pmo.org/mambo/index.php) to guide states' efforts to identify particular parties with interests and needs related to the EPHTN; 2) the Advocacy Subgroup is finalizing its "Advocacy in Action" brochure for communicating EPHTN messages to constituent groups http://www.ephtn-pmo.org/); and 3) the Risk Communication Subgroup has begun development of risk communication guidelines, (http://www.ephtn-pmo.org.php), including EPHT 101 Module 12: Communication.

The NH EPHT Program will use these materials to communicate State and National Network messages. To that aim, the NH EPHT Program has begun developing State Network communication strategies, including developing a website (http://www.des.state.nh.us/ehtp/) that provides information on the goals, objectives, and activities of the Program, as well as links to other resources. We have also produced a basic program Fact Sheet that has been distributed at

conferences, workshops, trainings, meetings and other events (see Appendix J: NH EPHT Fact Sheet).

NH EPHT's communications successes have been achieved without the benefit of Health Education staff. As of June 2006, the Program will hire a Health Educator, a 0.5 FTE position to be shared with the DES Environmental Health Program. Based on our experience with our shared NH DES epidemiologist, we expect to derive much more than "half-time" value from our Health Educator position. It has become apparent to us that placing a traditional public health professional within the environmental component of the EPHT sphere specifically serves the cross-education aims of the EPHT Program.

A priority of the national EPHTN is to address community concerns. NH EPHT will design and implement a statewide needs assessment to identify environmental public health issues of concern to NH communities. The results of this assessment will provide the basis for developing community outreach plans and activities. The development of this needs assessment will include collaboration with organizations such as Empowering Communities (http://www.ecnh.unh.edu/) at the New Hampshire Institute for Health Policy and Practice, the Community Health Institute (http://www.nhchi.org/), and the Jordan Institute (http://www.thejordaninstitute.org/). This collaboration will encompass all phases of the needs assessment from design and implementation through the dissemination of results and implementation of public health recommendations.

Based on this assessment, our Health Educator will develop and implement outreach plans that identify community needs, key target audiences, key National messages, and specific information that that is important to each community. A key component of our outreach plan is collaboration with environmental and public health agencies and groups from the public and

private sectors in order to strengthen key messages by pooling resources and avoiding redundancy. NH EPHT already has a working relationship with many of these groups including the NH DHHS Asthma Program, NH DES Radon Program, NH DHHS Tobacco Prevention Program, and NH DES Water Resources Program, American Lung Association of New Hampshire, and the New Hampshire chapter of the American Cancer Society.

The NH EPHT Program will assess the impact of our outreach and education activities as a component of our overall program evaluation. Methods such as online and paper surveys, focus groups, and the Delphi Technique, will be implemented to various samples of our target audiences. This evaluation will occur yearly in order to improve deficiencies or redirect activities that are not making an impact on their audiences. Radon outreach efforts focused on awareness and mitigation activities will be evaluated bi-annually with the NH Behavioral Risk Factor Surveillance Survey.

4.2   DEVELOP A STATE-LEVEL EPHT RISK COMMUNICATION STRATEGY

The National EPHT Program has provided limited guidance regarding risk communication following implementation of the State and National Networks. NH EPHT staff members Laura Holmes and Rick Rumba participated in a Risk Communication workshop held during the October 2004 National EPHT workshop in San Francisco. Laura Holmes has also participated in the Risk Communication subgroup of the PMO Workgroup (http://www.ephtn-pmo.org/mambo/index.php) since it was formed in 2006. As part of the NH EPHT outreach plan, we will identify populations in the State that are in need of risk communication messages. While New Hampshire is predominately a rural and affluent state, our largest urban city of Manchester, being a refugee resettlement area, must deal not only with a rapidly growing minority population with significant health disparities, but also with a method of advising on risk across extensive

language and cultural barriers. With the expertise of our program's Health Educator, CDC

guidelines, and the training resources provided by the Risk Communication subgroup, we will

develop and implement a general risk communication plan outlining the strategies for relaying

appropriate messages to targeted audiences. Additionally, this will assist in the development of

specific issue-based risk communication strategies targeted to populations that may have a

significant interest or relevancy to specific health outcomes, such as asthmatics who are sensitive

to poor air quality or populations that have high levels of lead poisoning in children. In particu-

lar, we will target the pockets of poverty that exist within our urban city of Manchester in order

to address certain environmental justice issues faced by disadvantaged residents, particularly

those forced to live in areas that have high concentrations of older housing. As with our outreach

and education plan, our risk communication strategies will be developed and implemented in

collaboration with Programs and Departments within NH DHHS, NH DES, and city health

departments that have similar audiences and messages. As a joint NH DES-DHHS staff member,

our Health Educator is in a position to be particularly effective in these collaborative activities.

Our Program has identified the need for a risk communication strategy regarding all our

priority EPHT areas.   In particular, there is an urgent need to pursue a risk communication

strategy in New Hampshire for radon exposure and lung cancer, especially for smokers or those

exposed to environmental tobacco smoke. Our NH DES-shared epidemiologist, John Colby, has

developed a presentation that communicates the risk of radon exposure and developing lung

cancer (RiskCommunicationforRadon_Lung.pdf), and the need to test and mitigate homes for radon,

where necessary. We will be presenting this material through targeted educational and outreach

activities (see Appendix K: Communication Strategies).

Arsenic in well water is a significant public health concern to NH residents. The NH EPHT Program has begun collaborating with the US Geographical Survey to estimate exposure for particular NH communities, create a 'Regional Atlas' of arsenic concentrations state-wide, and develop risk communication strategies. The USGS has obtained access to tests results from a large number of wells within the state. The results have been entered into a GIS database, but require refinement and modeling formulas. Through the Atlas, we are able to use a point-in-polygon approach to determine the geographic areas at risk for high arsenic concentrations in their well water. This information will provide our Program with the locations of key target communities for planned public health education outreach and risk communication strategies, and provide an excellent visual representation of potential arsenic exposures to communities throughout New Hampshire. We will also utilize this information in collaborative risk communication activities in collaboration with a number of partners, including: the NH DES Environmental Health Program (des.state.nh.us/ARD.html), NH DES Water Division (des.state.nh.us/water.htm), the NH chapter of the American Cancer Society (www.acscan.org), as well as the NH Realtors Association (nhar.org.php). In regard to turning these education efforts into improved policy, the NH Legislature has formed a 'Council to Study the Relationship Between the Environment and Health' (see Appendix L: Past Products). Two EPHT staff members, Matthew Cahillane and Richard Rumba, currently participate on the council's monthly meetings and have discussed the advantages of a policy initiative that would encourage private well water testing during real estate transfers.

5.0   DATA SHARING AND ACCESS

The ability to provide useful content to Network clients will require both a coordinated blend of partnerships with data stewards, and a well documented set of written data sharing

agreements. Our close collaboration with the 'human network' of data stewards has provided us with direct access and utilization to datasets from NH DHHS and NH DES, and readied us for State Network implementation. Samples of NH data sharing collaborations are available in Appendix N: NH Data Requests and Data Use Agreements.

5.1. Collaborate with Data Owners to Establish Data Sharing Agreements

As mentioned in Section 2, our parent agency, the DHHS Health Statistics and Data Management section, is the legislated NH authority (i.e. data owner) for public health data storage, analysis and public release. Our position within HSDM provides us with legal and authorized unrestricted access to all public health datasets, and as such, our Program has a limited need for new data sharing agreements.

Examples of our relationships include: 1) the integration of Program staff in HSDM and the participation in all aspects of data management, data cleansing and data interpretation; 2) participation in the NH DHHS Data Users Workgroup, and the Data Release Guidelines subgroup, where we will voice our needs for data standardization, data access and data sharing; 3) inviting a senior analyst in HSDM to participate on Network Content Workgroup conference calls; 4) working with the HSDM Systems Developer, John Southworth, to investigate opportunities for data linkage and new systems development, and; 5) participation in HSDM strategic planning process in order to make sure that the data, access, sharing, and network implementation needs of NH EPHT are embedded into the goals and objectives of HSDM and positioned as a priority within the larger NH DHHS agency mission.

Based on the past experiences of the NH EPHT Program, we expect few barriers to forming data sharing agreements that will allow role-based access to NH DHHS data, provided that we ensure appropriate confidentiality restrictions. The most likely barriers to arise would be a

need for identified or record-level datasets, or the release of data to certain stakeholders, and these will need to be address on a case-by-case basis.

Regarding access to stewards of environmental data, our MOA with NH DES has forged a productive partnership that has enabled the EPHT Program to access data on pollutants and sites. NH DES has created an Environmental Health section (http://www.des.state.nh.us/.html), and is now a partner in advancing 'public health' actions in the State. The EPHT Program is also included on the NH DES website as an example of our close working relationship (NH DES/EHP.html).

Regarding access to staff support, our ongoing Memorandum of Agreement (MOA) with NH DES provides the NH EPHT Program with in-kind support from NH DES staff members Richard Rumba, MPH and Vincent Perelli, MS, who have expert knowledge of datasets housed within the NH DES Air Resources, Water Division, and Waste Management programs. The MOU also provides EPHT support for two (2) shared positions within NH DES, including one (1) 1.0 FTE epidemiologist, filled by John Colby, PhD, and one (1) .50 FTE Liaison/Health Educator. This partnership also offers opportunities for additional collaborations with other environmental agencies and organizations with an interest in improving environmental health outcomes, both internal and external to the State, to ensure that our Program activities are effective, coordinated and consistent.

Environmental data from NH DES is predominantly considered public information and has no restrictions to access and availability, with the exception of personally identifiable data. Currently, NH DES is in the process of standardizing a number of datasets via the EPA Exchange Network and our Program has supported that effort. As well, past program activities have facilitated initial actions toward accessing data that is personally identifiable and previously

restricted, particularly data from home radon test kits housed in the NH DES Radon Program and private well water data housed in the NH DES laboratory. Through a data sharing agreement with NH DES, we will make content that is personally identifiable available in aggregated or modified form to conform to confidentiality restrictions.

These data sharing agreements and collaborations have enabled us to implement two demonstration projects: 1) link and analyze datasets from the NH State Cancer Registry, NH DES Radon Program, the Behavioral Risk Factor Surveillance Survey, and NH birth data for a risk communication presentation, (RiskCommRadonLung.pdf), and 2) link air monitoring data and ambulatory outpatient data to assess associations between exposure to air pollution and asthma.

In order for our Program to make environmental and health data available on the State and National Networks, we will develop formal data sharing agreements with data stewards of all current and future core measures identified by the Network Content workgroup. These agreements will allow use of case-level data, and delineate reporting of de-identified case-level data to the National Network.

6.0   FACILITATE EPHT TRAINING

In order to obtain a better understanding of the needs of the New Hampshire environ-mental health professionals that would be working with the tracking system and for the devel-opment of an effective tracking system that is responsive to their needs, the NH EPHT Program contracted the Community Health Institute in September 2004 to conduct an assessment of the capacity and training needs of the environmental health workforce in New Hampshire. This assessment, titled the *Assessment of Local Environmental Health Capacity*, focuses specifically on activities related to the tracking of environmental hazards, exposures, and human health

impacts in order to improve the surveillance of these environmental conditions (see Appendix L: Past Products).

The results of this assessment provided guidance for selection of topics and speakers for our first statewide outreach education effort, a conference entitled 'Environment and Health 2005: Clean Environments=Healthy People' in Concord, NH on September 13, 2005. We involved EPHT stakeholders and developed the conference in collaboration with the Northern New England Environmental Health Association (NNE-EHA), the NH Public Health Association, and the NH Health Officers Association. Results from this workforce assessment guided our decision to offer presentations and workshops on enforcement of State, local and federal rules and regulations regarding environmental health; water quality issues, reducing environmental hazards in the home that may exacerbate asthma; reducing injuries and environmental hazards in the workplace; indoor air quality and ventilation; and solid waste issues. As a result of our collaboration with NNE-NEHA, we also provided an EPHT workshop at the 2005 National Environmental Health Association (NEHA) Annual Educational Conference and Exhibition in Providence annual meeting in Rhode Island.

For future trainings, our Health Educator will we will utilize the results of our workforce assessment to develop and implement an EPHT 101 training curriculum targeted to NH DES and NH DHHS staff that will provide a thorough understanding of EPHT principles, and the services and products that our State and National Networks will offer. Our Health Educator, in collaboration with state and local public health agencies and organizations, will also provide on-site EPHT presentations and trainings to communities regarding how the State and National Networks can help them address their particular environmental health concerns. We also plan to contract with organizations that have similar missions, such as the Empowering Communities

(http://www.ecnh.unh.edu/), the Community Health Institute (http://www.nhchi.org/), and the NH

Institute for Local Public Health Practice (NHILPHP/), to provide EPHT 101 training to local

public health professionals, researchers, and other users of environmental and public health data.

We will also leverage our relationship with NEHA and NNEHA to develop EPHT training as

part of the continuing education of environmental health professionals.

7.0   ESTABLISH A TECHNICAL ADVISORY GROUP

The NH EPHT Program will establish a technical advisory group based on a number of

current NH committees that support our program, including our EPHT Stakeholder Advisory

Council, our EPHT Environmental Epi Team, and the DHHS Data Users Group (see Appendix

O: List of Technical Advisory Board Members). Each of these groups has the expertise to

provide recommendations on the implementation of the EPHT Network that will both utilize the

strengths of NH resources and blend well with larger national standards (NEDSS, EPA Ex-

change, etc.). To assist our OIT support staff, our Program will also require the formation of a

Network Users Group that will undertake a Rational Unified Process of defining the back-end

technology/processes and front-end web services that will be used by clients in order to ensure

that the State Network matches the needs and expectations of users.

The NH EPHT Program will also maintain our participation on the SND, Metadata, and

AVR workgroups in order to guide the process of making the EPHT Network compatible and

interoperable with the national Network standards and network architecture. Recently, NH

DHHS has formed a 'PHIN Certification Team' made up of six representatives from DPHS

Disease Control, Laboratory Sciences, and the EPHT Program who plan to make their data

exchange capabilities PHIN compliant. We intend to share our experiences with the PHIN

Certification Team with the appropriate national workgroups in order to facilitate the IT and support requirements of PHIN compliance.

8.0   STAFF CAPACITY AND PARTICIPATION IN NATIONAL WORKGROUPS

NH EHTP has been an active participant in CDC National EPHT Workgroups since the program received funding as a Part A Planning' grantee on October 1, 2002. Program manager, Matthew Cahillane, MPH, is a member of the Standards and Network Development Workgroup (SND). He has called in for monthly conference calls of the SND group and attended working sessions at all of the national workshops and conferences over the past three years. Laura Holmes is a member of the Program Marketing and Outreach (PMO) workgroup and within that group, the Risk Communication Team. Her background and expertise in desktop publishing provides invaluable insight for both NH and nationally. She also calls in for monthly conference calls and participates in working sessions at national meetings. Misty Richard is a new addition to the Health Disparities/Environmental Justice subgroup of the PMO Workgroup and the Geographic Locational Referencing subgroup of the SND Workgroup. She brings important knowledge of these topics to this workgroup from her dissertation work at Louisiana State University focusing on minority health outcomes. As mentioned in Section 2.1, our program will participate fully within the Network Content workgroup and subgroups and will offer our unique contribution of epidemiological expertise to all efforts put forth by this group.

9.0   COLLABORATION ACTIVITIES IN NH

Collaboration among state/local public agencies and related organizations is paramount to the successful implementation of the State Network and the National EHT Network, both to ensure The NH EPHT Program has a history of successful collaborations with a variety of governmental and nongovernmental agencies and organizations (see Appendix M: NH EPHT

Collaborations). Since the inception of our program, we have benefited greatly from the collaborative relationships we have built and maintained. These relationships, both internal and external, have resulted in improved access and sharing of data and information, efficient resource sharing, reduced duplication of effort, and increased overall influence and program effectiveness, and have been instrumental in helping our Program develop "proof-of-concept" demonstrations and data linkage pilot projects for radon and lung cancer and air quality and asthma exacerbation. Examples of other collaborations include: 1) a demonstration project with the City of Manchester, NH to collect indoor air quality data in a public school and develop a methodology to analyze that data in conjunction with asthma exacerbation data from STEMS, the school nurse intake database; 2) collaboration with the NH Cancer Registry for development of a poster presentation detailing the use of NH's radon and lung cancer data as a tool for risk communication at the 2006 Annual Meeting of the North American Association of Central Cancer Registries; 3) and our ongoing collaboration with the University of New Hampshire to develop tracking and measurable indicators for the analysis of a relationship between air quality and asthma exacerbation in targeted populations.

We plan to maintain collaborative relationships with these and other stakeholders as we move toward full implementation and solicit feedback regarding areas such as identifying procedures for accessing network information, complying with privacy rules and regulations, defining measures, and developing and adopting standards. As well, we plan to expand our collaborations with IT agencies and network managers in the full-time local health departments of Manchester and Nashua, NH. As valuable as these collaborations have become to the development of our State Network, their value will become even greater as we expand the system into a sustainable inter-state network.

10.0 CONDUCT A COMPREHENSIVE PROGRAM ASSESSMENT

Program evaluation is a core public health activity and a guiding goal of the NH EPHT Program. Since 2002, the NH EPHT Program has implemented ongoing program evaluation activities that provide a feedback loop for the development of program activities that will produce our desired outcomes. Laura Holmes, NH EPHT Program Specialist, is currently finishing a master's degree in public administration with a concentration on program evaluation and has guided the Program toward building a programmatic framework based on the principles of effective, efficient and results-oriented management. The NH EPHT Program has utilized these principles to create our mission, vision, and value statements; develop program goals and objectives that are SMART (specific, measurable, achievable, realistic, and timely); identify performance measures; conduct a stakeholder analysis; produce a logic model; and develop work plans, and budgets that reflect the desired State and National EPHT program goals, and outcomes to improve the health of communities.

Early in the grant period, our Program will design, implement and publish a comprehensive program evaluation of all NH EPHT activities in order to ensure timely completion of required RFA tasks and integrate lessons learned. Evaluation components will be based on the CDC Framework for Program Evaluation in Public Health guidelines (ftp://ftp.cdc.gov/pub/Publications/mmwr.pdf), and Guidelines for Evaluating PH Surveillance (www.cdc.gov/mmwr/preview/mmwr.htm), as well as the W.K. Kellogg Foundation Evaluation Handbook (Kellogg Evaluation.pdf). The program evaluation will be completed by July 2007 and will be reviewed annually in order to identify performance measures, program activities, and outcomes that need to be changed or eliminated. Evaluation processes will also identify areas where Network data can be used to inform or change public health practice. The NH EPHT

Program will also utilize the completed program evaluation to prepare a written report outlining

lessons learned from all activities designed to implement the state EPHT network.

11. DEVELOP AN ANNUAL 'STATE OF THE NATIONAL EPHT' REPORT

The NH EPHT Program will fully collaborate with the CDC to develop an annual state of

the National EPHT Program Report in order to promote the achievements of the National EPHT

Program. NH's contribution to this effort will be particularly beneficial due to our prior

experience producing such publications, including staff member Laura Holmes' 15 years'

experience writing, editing and publishing promotional materials. Our program is presently

collaborating with the NH DES to produce this year's State of the Environment Report, which

will include a section on the Indoor Environment written and edited by our staff. Other publica-

tions produced by NH Division of Public Health Services include *Healthy NH 2010* and

Improving the Public's Health in NH. NH EPHT Program staff looks forward to sharing lessons-

learned and participating in the workgroup that will likely be formed to meet this objective.